CLAIMS

1. An oxidized acrylic fiber nonwoven fabric, characterized in that it has a weight per square-meter of 70 to 190 g/m^2, a thickness of 0.1 to 0.3 mm and a density of 0.35 to 0.8 g/cm^3.

2. An oxidized acrylic fiber nonwoven fabric, according to claim 1, wherein the thickness change due to compression as the difference between the thickness at a planar pressure of 0.15 MPa and the thickness at a planar pressure of 1.0 MPa is 0.15 mm or less.

3. An oxidized acrylic fiber nonwoven fabric, according to claim 1, wherein the oxidized acrylic fibers are oriented also in the thickness direction of the nonwoven fabric.

4. An oxidized acrylic fiber nonwoven fabric, according to claim 1, which is substantially formed of oxidized acrylic fibers only.

5. A carbon fiber nonwoven fabric, characterized in that it is formed of carbon fibers and has a weight per square-meter of 50 to 150 g/m^2, a thickness of 0.1 to 0.25 mm, a density of 0.3 to 0.7 g/cm^3, a surface roughness Ra of 30 μm or less, a tensile strength of 0.2 kgf/cm or more and a maximum fracture radius of 20 mm or less.

6. A carbon fiber nonwoven fabric, according to claim 5, which is substantially formed of carbon fibers only.

7. A carbon fiber nonwoven fabric, characterized in that it

is formed of substantially carbon fibers only and has a weight per square-meter of 50 to 150 g/m^2, a thickness of 0.1 to 0.25 mm, a density of 0.3 to 0.7 g/cm^3, a surface roughness Ra of 30 μm or less, a peak size of 10 to 60 μm in the pore size distribution and a tensile strength of 0.2 kgf/cm or more.

8. A carbon fiber nonwoven fabric, according to claim 5 or 7, wherein the thickness change due to compression as the difference between the thickness at a planar pressure of 0.15 MPa and the thickness at a planar pressure of 1.0 MPa is 0.15 mm or less.

9. A carbon fiber nonwoven fabric, according to claim 5 or 7, wherein the modulus of elasticity in flexure is 0.1 GPa or more.

10. A carbon fiber nonwoven fabric, according to claim 5 or 7, wherein the differential pressure occurring when air of 14 cm/sec is permeated through the nonwoven fabric in the thickness direction is from 1 to 10 mm Aq.

11. A carbon fiber nonwoven fabric, according to claim 5 or 7, wherein the electric resistance in the thickness direction is 15 mΩ·cm^2 or less.

12. A carbon fiber nonwoven fabric, characterized in that it has a weight per square-meter of 60 to 110 g/m^2, a thickness of 0.13 to 0.22 mm, a density of 0.4 to 0.7 g/cm^3, a maximum fracture radius of 20 mm or less, a surface roughness Ra of 20 μm or less, a thickness change due to compression as the difference between the thickness at a planar pressure of 0.15 MPa and the thickness at a planar pressure of 1.0 MPa is 0.1 mm or less, a tensile strength

of 0.5 kgf/cm or more, a modulus of elasticity in flexure of 0.1 GPa or more, a peak size of 15 to 50 μm in the pore size distribution, an electric resistance of 15 $m\Omega \cdot cm^2$ or less in the thickness direction, and a differential pressure of 2 to 7 mm Aq occurring when air of 14 cm/sec is permeated through the nonwoven fabric in the thickness direction.

13. A carbon fiber nonwoven fabric, according to claim 5 or 12, wherein carbon black is contained on the surface of and/or inside the fabric.

14. A carbon fiber nonwoven fabric, according to claim 5 or 12, which contains a water-repellent substance.

15. A carbon fiber nonwoven fabric, characterized in that it is formed of carbon fibers and a water-repellent substance and has a weight per square-meter of 60 to 180 g/m^2, a thickness of 0.1 to 0.25 mm, a density of 0.35 to 0.9 g/cm^3, a surface roughness Ra of 25 μm or less, a maximum fracture radius of 20 mm or less and a modulus of elasticity in flexure of 0.5 GPa or more.

16. A carbon fiber nonwoven fabric, according to claim 15, wherein the thickness change due to compression as the difference between the thickness at a planar pressure of 0.15 MPa and the thickness at a planar pressure of 1.0 MPa is 0.15 mm or less.

17. A carbon fiber nonwoven fabric, according to claim 15, which has a tensile strength of 0.7 kgf/cm or more.

18. A carbon fiber nonwoven fabric, according to claim 15, wherein the differential pressure occurring when air of 14 cm/sec

is permeated through the nonwoven fabric in the thickness direction is from 2 to 12 mm Aq.

19. A carbon fiber nonwoven fabric, characterized in that it is formed of carbon fibers and a water-repellent substance and has a weight per square-meter of 70 to 130 g/m^2, a thickness of 0.13 to 0.22 mm, a density of 0.45 to 0.7 g/cm^3, a surface roughness Ra of 15 μm or less, a maximum fracture radius of 20 mm or less, a thickness change due to compression of 0.1 mm or less as the difference between the thickness at a planar pressure of 0.15 MPa and the thickness at a planar pressure of 1.0 MPa, a tensile strength of 1.0 kgf/cm or more, a modulus of elasticity in flexure of 1.0 GPa or more and a differential pressure of 2 to 8 mm Aq occurring when air of 14 cm/sec is permeated through the nonwoven fabric in the thickness direction.

20. A carbon fiber nonwoven fabric, according to claim 15 or 19, which is substantially formed of carbon fibers and a water-repellent substance only.

21. A carbon fiber nonwoven fabric, characterized in that it is formed of carbon fibers, fine carbon particles and a water-repellent substance, with the fine carbon fibers existing locally on one side of the nonwoven fabric, and has a weight per square-meter of 70 to 200 g/m^2, a thickness of 0.12 to 0.27 mm, a surface roughness Ra of 15 μm or less, a thickness change due to compression of 0.15 mm or less as the difference between the thickness at a planar pressure of 0.15 MPa and the thickness at

a planar pressure of 1.0 MPa, and a tensile strength of 0.7 kgf/cm or more.

22. A carbon fiber nonwoven fabric, according to any one of claims 5, 7, 12, 15, 19 and 21, wherein the carbon fibers are oriented also in the thickness direction of the nonwoven fabric.

23. An electrode using the carbon fiber nonwoven fabric as set forth in any one of claims 5, 7, 12, 15, 19 and 21.

24. An electrode diffusion layer using the carbon fiber nonwoven fabric as set forth in any one of claims 5, 7, 12, 15, 19 and 21.

25. A fuel cell unit, characterized in that the electrode diffusion layer as set forth in claim 24, a catalyst layer and a polymeric electrolyte membrane are disposed in layers.

26. A fuel cell, comprising the electrode diffusion layer as set forth in claim 24.

27. A method for producing the oxidized acrylic fiber nonwoven fabric as set forth in claim 1, including the step of pressurizing a nonwoven fabric obtained by using oxidized acrylic fibers, at a temperature of 140°C or higher and at a linear pressure of 5 to 200 kgf/cm in the thickness direction using a continuous press.

28. A method for producing the carbon fiber nonwoven fabric as set forth in any one of claims 5, 7, 12, 15, 19 and 21, comprising the steps of pressurizing a nonwoven fabric obtained by using oxidized acrylic fibers, at a temperature of 140°C or higher and at a linear pressure of 5 to 200 kgf/cm in the thickness direction,

and carbonizing the oxidized acrylic fiber nonwoven fabric.

29. A method for producing the oxidized acrylic fiber nonwoven fabric as set forth in claim 1, including the step of pressurizing a nonwoven fabric obtained by using oxidized acrylic fibers, at 140 to 300°C and at 0.5 to 40 MPa for 30 seconds or more by a continuous method.

30. A method for producing the carbon fiber nonwoven fabric as set forth in any one of claims 5, 7, 12, 15, 19 and 21, comprising the steps of pressurizing a nonwoven fabric obtained by using oxidized acrylic fibers, at 140 to 300°C and at 0.5 to 40 MPa for 30 seconds or more by a continuous method, and carbonizing the oxidized acrylic fiber nonwoven fabric.

31. A method for producing the oxidized acrylic fiber nonwoven fabric as set forth in claim 1, comprising the steps of pressurizing a nonwoven fabric obtained by using oxidized acrylic fibers, at a temperature of 140°C or higher and at a linear pressure of 5 to 200 kgf/cm in the thickness direction by a continuous method, and pressurizing at 140 to 300°C and at a planar pressure of 0.05 to 40 MPa for 10 seconds or more by a continuous method.

32. A method for producing the carbon fiber nonwoven fabric as set forth in any one of claims 5, 7, 12, 15, 19 and 21, comprising the steps of pressurizing a nonwoven fabric obtained by using oxidized acrylic fibers, at a temperature of 140°C or higher and at a linear pressure of 5 to 200 kgf/cm in the thickness direction by a continuous method, and pressurizing at 140 to 300°C and at

a planar pressure of 0.05 to 40 MPa for 10 seconds or more by a continuous method.

33. A method for producing an oxidized acrylic fiber nonwoven fabric, according to claim 29 or 31, wherein the pressurization using a planar pressure by a continuous method is performed by a method comprising intermittent material carrying and a flat plate press in combination.

34. A method for producing a carbon fiber nonwoven fabric, according to claim 30 or 32, wherein the pressurization using a planar pressure by a continuous method is performed by a method comprising intermittent material carrying and a flat plate press in combination.